CALIFORNIA PLUMBING CODE

DRAINAGE AND VENTING SYSTEMS

MINIMUM SIZE OF TRAPS AND DRAINAGE PIPES

Fixture	Min. Trap Size	Min. Horizontal Pipe Size	Min. Vertical Pipe Size
Bathtub	1 1/2"	2"	1 1/2"
Clotheswasher	2"	2"	1 1/2"
Laundry Sink	1 1/2"	2"	1 1/2"
Shower	2"	2"	2"
Kitchen Sink	1 1/2"	2"	2"
Bar Sink	1 1/2"	1 1/2"	1 1/2"
Wash Basin	1 1/4"	1 1/4"	1 1/4"
Toilet	built into toilet	3"	3"

CHANGE-OF-DIRECTION FITTINGS

Changes of direction in drainage piping must be made with 1/16 bends (22 1/2°), 1/8 bends (45°), 1/6 bends (60°), or other fittings with equivalent sweep. Quarter bends (90°) do not have equivalent sweep unless they are the long sweep type.

Where one drainage pipe discharges into another, it must be through a wye (45° or 60°), or combination wye and 1/8 bend (also called combo or long turn tee-wye) except in the case of a horizontal pipe discharging into a vertical pipe. In this case, a sanitary tee is acceptable. A horizontal pipe is defined as sloping 45° or less from the horizontal. A vertical pipe is defined as sloping 45° or more from the horizontal.

CLEANOUTS

A cleanout is required at the upper end of every drainage pipe with the following exceptions:
1) Horizontal branches less than 5' long, unless they serve sinks or urinals.
2) Pipes which slope 18° or more from the horizontal.
3) Pipes above the first story.
4) See the SEWER section for City cleanout requirements at the property line.
An additional cleanout is required every 100' and for each aggregate change of direction exceeding 135°.

Cleanouts must be accessible. Underfloor cleanouts must be within 20' of an access opening and there must be a clear passageway at least 18" high and 30" wide between the access opening and the cleanout. This means that any ducts or pipes which cross this passageway must have 18" clear space under them, which may require some digging. Twelve inches clear space is required in front of a cleanout 2" or smaller and 18" for those larger than 2". Cleanouts for underground pipes must be extended to grade.

SLOPE AND SUPPORT OF DRAINAGE PIPES

Generally, drainage pipes must slope a minimum of 1/4" per foot. However, in cases where this is not possible, 4" pipe or larger can be sloped 1/8" to the foot. Horizontal ABS pipe must be supported at least every 4'.

TRAPS AND VENTING - GENERAL

Every plumbing fixture must have a trap and every trap must be protected with a vent pipe. The purpose of the trap is to form a water seal which prevents sewer gas from entering the building. The purpose of the vent is to assure that the water in the trap is not pushed or sucked out by the movement of water through other parts of the drainage system.

Generally, each fixture must be separately vented before the drain from that fixture connects with the drain from any other fixture.

VENT PIPE SLOPE AND CONNECTIONS

Vent pipes must be graded and fittings arranged so that moisture will return to the drainage piping.

Where a vent pipe connects to a horizontal drainage pipe, it must connect to the upper half of the pipe. A vent connected to the side of a horizontal drainage pipe is not permitted. Vent pipes should not run horizontally (less than 45° slope) unless they are at least 6" above the flood level rim of the fixture they serve.

Except for toilets, the connection of the vent pipe to the drainage pipe must be above the level of the standing water in the trap.

SIZE OF VENT PIPES

Fixture	Min. Vent Size
Bathtub	1 1/2"
Clothes washer	1 1/2"
Laundry Sink	1 1/2"
Shower	1 1/2"
Kitchen Sink	1 1/2"
Bar Sink	1 1/4"
Wash Basin	1 1/4"
Toilet	2"

VENT TERMINATIONS

Vent pipes must terminate at least 6" above the roof and 1' from any vertical surface. The termination must also be 3' above or 10' horizontally from any openable skylight or window.

TESTING DWV SYSTEMS

Drainage and venting systems must be tested with air or water. A water test is done by closing all openings in the system and filling it with water to a height of at least 10' above the highest fitting. For the top-out test, tub waste-and-overflows and shower traps must be hooked up and included in the test. An air test of 5 psi is also acceptable, but must be done with a gauge which reads maximum 10 psi at full scale. In rainy weather, an air test is required for exposed piping because water leaks can't be detected.

SEWERS

The building sewer begins 2' outside the building and connects the building drainage system to the septic system or public sewer. Grading requirements are the same as for drainage pipes. A separate sewer cleanout is generally required and must be extended to grade. The sewer line is tested by plugging its lower end and filling it with water to its highest point. An air test of 5 psi is also acceptable. The City Public works Department has a policy requiring additional cleanouts, near the sidewalk/property line which allows the City to provide some remedy for blockages of the sewer on the street side. Contact the Public Works Department at 616-7065 for details if your project includes new plumbing fixtures.

WATER SUPPLY SYSTEMS

GENERAL REQUIREMENTS

Solder in potable water systems must be the "lead-free" type.

Underground water pipes must be at least 12" deep. Steel pipe in a building and in or under a slab-on-grade must be factory wrapped pipe. Regular galvanized pipe is not acceptable. Copper pipe in the same situation should be installed without joints where possible by using soft copper, which is available in 60' and 100' rolls. Where joints are necessary, they must be brazed rather than soldered and the fittings must be copper rather than brass.

Copper and steel material should never be directly connected. They must be separated by brass or a dielectric fitting.

BACKFLOW PREVENTION DEVICES

Every hose outlet and every landscape watering device which connects to the potable water system must do so through a suitable backflow prevention device. Screw-on vacuum breakers are available for hose bibbs. Landscape watering devices can be supplied through a vacuum breaker provided the vacuum breaker is at least 6" above any outlet it serves, and further provided there are no shutoffs downstream from the vacuum breaker.

If there are any shutoffs downstream from the backflow prevention device, it must be a pressure vacuum breaker. These are required to be at least 12" above any outlet they serve.

Where the backflow prevention device is below any of the outlets it serves, a double check valve is required.

VALVES REQUIRED

Every building with water must have a fullway valve (one with an opening as big as the pipe it serves) which shuts off the entire building. Water heaters are also required to have a fullway valve on the cold water inlet. Shutoffs must be provided at each connection of a fixture or appliance to the water supply system.

PRESSURE REGULATORS

Water pressure at the point of use must be no less than 15 psi and no more than 80 psi. If the pressure exceeds 80 psi, a pressure regulator is required.

RELIEF VALVE

Storage water heaters must have a temperature and pressure relief valve with a drain to the outside of the building. The end of this drain must be pointing down, unthreaded, and between 6" and 24" above the ground. Termination of this drain in the underfloor crawlspace is not acceptable.

SIZE OF WATER PIPES

The water supply pipe to any building must be at least 3/4". Most homes will require a 1" supply pipe or larger, based on the number and type of outlets, the length of pipe from the source to the farthest outlet, and the pressure at the source. Details of how to calculate water pipe sizes are found in Section 610 of the California Plumbing Code.

SUPPORT OF WATER PIPES

Horizontal copper water pipes up to 1 1/2" size must be supported at least every 6 feet. A galvanized support

must not touch a copper pipe directly. Any metal support in direct contact with a copper water pipe is a potential source of noise when the water is turned on and off at the fixtures.

Horizontal galvanized water pipes of 3/4" size or smaller must be supported at least every 10'. For 1" size and larger the supports must be at least every 12'. Please note this does not apply to gas pipe, which requires more support than water pipe.

Pipes which are buried must be continuously supported before backfilling. In rocky soil where an even trench bottom is not always possible, sand is often used to provide an even bed for the pipe.

TESTING WATER SYSTEMS

Hot and cold water pipes must be tested with actual on-site water pressure or with 50 psi air pressure. These tests must hold tight for 15 minutes.

FUEL GAS SYSTEMS

GENERAL REQUIREMENTS

Above-ground gas pipe must be black steel, galvanized steel, or brass. Copper is not acceptable. Gas pipe must be at least 6" above the ground unless it's a type approved for burial. Buried gas pipe is not permitted within any building or structure.

Every appliance is required to have an accessible shutoff valve within 3' of the appliance and ahead of the union connection to the appliance.

FITTINGS

The couplings or "thread protectors" which are commonly supplied with lengths of pipe are not tapered-thread type and are not permitted to be used. Ground-joint unions are only allowed at exposed appliance connections or outside the building on the outlet side of the building shutoff valve. In all other situations where a union-type connection is required, a left-right nipple and coupling must be used. Bushings are only permitted in exposed locations and must not be used where they will be covered by permanent construction.

UNDERGROUND GAS PIPE

Underground gas pipe must be factory coated steel pipe, or approved PVC or PE gas pipe.

Factory coated steel pipe is required to be at least 12" below grade. All fittings, short nipples, and nicks in the factory coating must be wrapped with tape which is listed and marked for that purpose. Such tape is commonly available in 10 mil and 20 mil thickness, but it must be applied spirally so that the final thickness is at least 40 mils. This type of underground gas pipe has to be separated from the above-ground gas pipe by a dielectric union or an electrically isolation fitting/ coupling.

FLEXIBLE CONNECTORS

Appliance connections, whether rigid or flexible, must be at least as big as the inlet of the appliance they serve.

Flexible connectors can't be longer than 3', except for ranges and dryers, which can be up to 6' long. They must be totally exposed and can't penetrate any wall, floor or appliance housing. If used outside, they must have a label showing that they have been tested and approved for such use. The appliance shutoff valve must be immediately ahead of the flexible connector and at least as big as the connector.

SIZE OF GAS PIPES

Every section of gas pipe must be large enough to handle the maximum demand of all appliances which it serves. Section 1217 of the California Plumbing Code gives details on how to calculate minimum pipe sizes for gas lines.

SUPPORT OF GAS PIPES

The following chart shows the maximum allowable interval between supports for gas pipe:

Pipe Size	Horizontal Pipe	Vertical Pipe
1/2"	6'	6'
3/4" or 1"	8'	8'
1 1/4" or larger	10'	every floor level

TESTING GAS SYSTEMS

Gas pipe must be tested with air pressure to prove that the pipes are gas tight. Usually a test pressure of 15 psi is adequate, using a gauge which reads maximum 30 psi at full scale. The pipes must hold **all** of the pressure for a minimum of 15 minutes. If the volume of the piping system is large, more pressure or a longer test may be necessary. This test is done after sheetrock, siding, etc. are completely installed, but before any valves or flexible connectors are added to the gas system. In the case of altering or adding to an existing gas system, the test must include the existing part of the system as well as the new work. This will involve removing all of the valves and capping the pipe at each outlet.

NEW GAS SERVICE

Before approval is given for PG&E to provide gas service, the gas test described above must be passed.